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ABSTRACT

Advances in technology and health care delivery have included the use of telemedicine and telepsychology for crisis intervention, assessment, treatment, and education of patients. The use of telemedicine and telepsychology is examined for a variety of health care services to rural America. Telehealth has been considered a partial solution to the problems of delivering health care to remote and underserved areas. New systems of managed care have recognized that unequal geographic distribution of health care resources and the need for cost-effective health care provision necessitates new models for assessment, treatment, prevention, and consultation. Telehealth is defined, and models for telehealth are presented. Satellite transmission is at the cutting edge of telehealth; clinical applications are listed. The application of technology advances to the interface of education and healthcare is discussed. Changing patterns of school health care delivery are summarized. A program for "Rural Utilities Services-Distance Learning and Telehealth applications to school districts" in rural Kentucky is described. Issues of confidentiality and service provision to be addressed are listed; these are especially important for telehealth applications in psychotherapy. (EMK)

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Title: **Telehealth: New Directions and Technology for Health Care Delivery in the Schools**

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Introduction

Advances in technology and health care delivery have included the use of telemedicine and telepsychology for crisis intervention, assessment, treatment, and education of patients. Examined is the use of telemedicine and telepsychology for a variety of health care services to rural America. Efforts to date have ranged from using closed circuit television to bringing psychological consultation and health care to patients a few miles away as well as using satellite uplinks to provide psychological consultation and training to health care professionals in international sites.

Telehealth has been considered a partial solution to the problems of delivering health care to remote areas, as well as to areas underserved by health care professionals, including psychologists. Various projects have demonstrated a wide variety of clinical tasks that can successfully be accomplished by a television, telemetry, and voice communication systems. The need for such systems is obvious in the face of the major obstacles to providing a high standard of psychological health care delivery.

New systems of managed care have recognized that unequaled geographic distribution of health care resources, and the recognized need to health care provision in an economically pressed, cost effective environment necessitates new models for assessment, treatment,

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prevention, and consultation.

Telehealth is seen as the use of telecommunication which connects consumer with health care provider through live, two way audio, two way video transmission, across distances and permits effective diagnosis, treatment, and other health care activities. This definition stresses a focus on delivery of services across distances with a sense of concern for ethical provision of services and confidentiality of the health care needs in our society.

Models for Telehealth

The technology of telehealth involves interactive video transmission. Currently, two transmission modes exist: analog and digital. The analog mode, transmitted in the form of waves, is the technology of broadcast television. Among its advantages are the high resolution of the images transmitted and its familiarity. There are disadvantages with interactive video transmission, the most prominent of which is the expense associated with transmission and the size and complexity of the hardware that is required for such efforts. The digital mode, on the other hand, takes advantage of developments in computer science and transmits in the form of a digital byte-stream of zero's and one's. Its advantages are lower transmission costs, reduced equipment size, simplicity of operation and easy interface with computers and with computerized systems. The relative disadvantages of the digital system appear to include the so called echoes of motion that appear at slow transmission speeds. It is however, noted that the working components of interactive video transmission are the equipment set and the transmission set itself. At the heart of this equipment is the CODEC which is an acronym for Coder-Decoder. This equipment transforms the analog signal to a digital one at one end of the network and back again at the other. To transmit live video images, a video camera is needed at each site. It is augmented by microphone to pick up speech and other audible information so that those on each

end can see and hear what is being sent to each site by the other.

At the cutting edge of the technology of telehealth is satellite transmission. Such opportunities transcend geographic limitations and means that interactive video systems can reach almost any location worldwide. Numerous clinical applications have been found to be useful and effective. These include:

- Initial interview and evaluation
- One time consultations for crisis stabilization
- Brief screening psychological assessment
- Psychological testing with the assistance of a psychology technician at the site
- Short term counseling
- Vocational assessment, counseling and placement
- Evaluations and diagnostics related to second opinions
- Short term case management
- Consultation-liaison services
- Consultation with primary care physicians and/or specialists, clinicians and educators
- Continuing education
- Educational, administrative, and other clinical applications, including education for continuation of professional licensure

Interface of Education and Healthcare

Technology advances in education and health care delivery have included the use of distance learning for prevention interventions, assessments, treatment, and self management skills training to rural populations. Its application to child and family services and the justice system

hold promise (Berek & Canna, 1994). Few studies have emerged to assess the effectiveness of these initiatives. Efforts to date have ranged from using closed circuit television to bringing educational programs to distance sites a few miles away as well as using satellite uplinks to provide education and training to international sites (Scott, 1994).

The concept of Telehealth first became known as telemedicine, and was restricted to the use of technology to provide off-site medical care. Its application for consultation to school systems, community agencies and regional centers for prevention education and intervention services offers innovative opportunities to address the needs of rural populations (Newhouse, 1993; Sanders & Bashshur, 1995).

Tele-education has been considered a partial solution to the problems of delivering educational services and prevention education and interventions to schools in remote rural areas, as well as to areas undeserved by health care professionals. Various projects have demonstrated a wide variety of clinical tasks that can successfully be accomplished by telemetry and voice communication systems. The need for Tele-education delivery to schools is obvious in the face of the major obstacles to providing a high standard of prevention interventions and health care delivery. Changing patterns of school health care delivery are summarized in Figure 1.

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Figure 1 about here

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Purpose and Goals:

Rural Utilities Services--Destance Learning and Telehealth applications to school districts

Goal A: Reduce the isolation of health care providers in rural western Kentucky through the expansion and enhancement of the video conference network which provides

educational and clinical consultative servies.

Goal B: Increase access to medical consultative services and health education programs for rural populations in rural Kentucky.

Objective 1: Expand the number of health care partners participating in the KTLN through installation of video conference systems, and 2 protable desk top video conference systems.

Objective 2: Expand the multi-point control unit capabilities to enable additional sites to participate in programming.

Objective 3: Expand the development and effective use of programs and services related to the proposed expansion of the KTLN

Rural Health Outreach through the school systems has the following goals and objectives:

Goal A: Improve and expand ambulatory health care services to underserved areas in the eight counties of rural western Kentucky.

Objective 1: Establish three new certified rural health care clinics in te schools

Objective 2: Enhance existing rural health care clinics and selected rural hospitals through telecommunications.

Goal B: Provide a feasible and sustainable system of physician and clincian consultations using telemedicine video conferencing.

Objective 1: Implement clinical applications using telecommunications.

Goal C: Provide easy access to consisten and current education programs for western Kentucky health care providers.

Objective 1: Provide clinical applications using telecommunications.

Goal D: Provide local resources for health education and community development.

Objective 1: Establish community health education programs and support groups.

Objective 2: Develop community use of video conferencing.

Rural Elevtification Administration--Distance Learning and Telemedicine Link Grant

Goal A: Reduce the isolation of health care providers in Western Kentucky through the development of innovative consultation video conferencing systems that enhance the diagnostic, treatment, consultative and educational services available to health care providers.

Goal B: Increase access to specialty medical services and health education programs for rural populations.

Goal C: Encourage the use of telecommunication is rural communities to decrease the time, inconvenience, expense and risks of travel, as well as other associated problems distance and isolation cause in obtaining health care services.

Objective 1: Install telepsychiatry equipment at two end user sites and video conferencing equipment at four end user sites.

Objective 2: Ensure the development and effective use of programs related to the proposed telepsychiatry and video conferency systems between the hub site and the four end user sites.

Recently identified systems of managed care have recognized that unequal geographic distribution of health care resources, and the recognized need for health care provision in an economically pressed, cost effective environment necessitate new models for assessment, treatment, prevention, and consultation (PPRC, 1995). Telehealth is seen as the use of telecommunication and distance learning technology, which connect consumer with health care provider through live, two-way audio, two way video transmission, across distances and permits

effective diagnosis, treatment, education and other health care activities. This definition stresses a focus on delivery of services across distance with a sense of concern for ethical provision of services and confidentiality of the health care needs in our society. An alternative way of providing traditional health services, telehealth is considered by some to be a solution to America's toughest health care challenges: increasing access to prevention programs and health care while decreasing the costs involved in providing quality care (Office of Rural Health Policy, 1994).

Interactive Electronic Communication with School Systems

Kingdom (1995) wrote in a recent editorial in Science that addressing health care delivery through tele-education at all levels is fundamental. Theories about the nature of knowledge and methods of education have been debated for sometime. Is knowledge a mountain of fact for the learner to conquer or is it an ever-changing stream of theories and new conceptions through which on must learn about our world? Would students master facts or develop problem solving skills? Learning occurs most easily when the learning experience is directed toward the solving of a real problem with which one can identify, and when it uses an understandable approach in which the effectiveness of an intervention can be readily pursued. Legitimate educational projects include the real problems facing consumers, clinicians and health care and health education institutions. Solutions found in one location may be shared with collaborating institutions, facilitating exchange of information with each other. In a comment on the evolution in higher education, Abelson (8 August 1997: 747) argues: "Universities and colleges in the United States are encountering a turbulent climate. The quality of their future in many ways depends on how well they respond to evolving realities in the larger world beyond their walls. Ultimately the most significant change effecting universities may be continuing revolution in information technology

and delivery of healthcare services."

At the cutting edge of the technology for education and healthcare employees 21st century skills in the schools and the use of satellite transmission. Opportunities such as these transcend geographic limitations and means that interactive video systems can reach almost any location worldwide. Numerous educational and clinical applications are being studied. These include:

- Multidisciplinary panel consultation to school systems with a team of medical specialists providing management of a spectrum of healthcare needs in the schools
- Single consultations for crisis stabilization, learning disorders, cults and suicidal ideation
- Brief screening using psychological assessment and treatment planning for individual students
- Short term counseling with students in need with national specialists
- Vocational assessment counseling and placement through a national network
- Evaluations and diagnostics workshops related to treatment for the student seen in schools needing specialized health care and treatment
- Short term case management with health officials and school administrators
- Consultation with university based primary care physicians and specialists dealing with school related problems and appropriate interventions for managing such conditions
- Continuing education for faculty, students and administrators, and panels of experts who are prevention-intervention scientists and practitioners
- Educational, administrative, and other clinical applications, including education for continuation of professional certification and licensure, prevention education programs on diet, nutrition, exercise, alcohol and substance abuse and other relevant topics

New systems of managed care have recognized that unequaled geographic distribution of

health care resources, and the recognized need for health care provision in an economically pressed, cost effective environment necessitates new models for assessment, treatment, prevention, and consultation.

Tele-education applications through the schools are seen as the use of telecommunication which connects consumer with health care provider through live, two-way audio, two-way video transmission, across distances and permits effective diagnosis, treatment, and other health care activities. It is recognized as interactive telemedicine. This definition stresses a focus on delivery of services across distances with a sense of concern for ethical provision of services and confidentiality of the health care needs in our society.

The technology of telemedicine and tele-education involves interactive video transmission. Currently, two transmission modes exist: Analog and digital. The analog mode, transmitted in the form of waves, is the technology of broadcast television. Among its advantages are the high resolution of the images that are transmitted. There are noted disadvantages as well with interactive video transmission. The most prominent disadvantage noted is the expense associated with transmission and the size and complexity of the hardware that is required for such efforts. The digital mode, on the other hand, takes advantage of developments in computer science and transmits in the form of a digital byte-stream of zero's and one's. Its advantages are lower transmission costs, reduced equipment size and simplicity of operation.

The future of telehealth and the use of telemetry in health care provision through the schools through interactive television places considerable these have to do with issues of confidentiality and service provision. While the day may come when telehealth technology sees the use of this medium for psychotherapy, all decisions about therapeutic intervention must be

informed decisions to the consumer. Research on these and other related issues related to telemetry must become an integral part of our preparation from managed care and health care delivery to rural America in the 21st century.

Among the critical issues to be addressed are the following:

1) Provision of services: The impact of telemetry on rural health care provides a stabilizing factor and permits programs of psychoeducation and other therapeutic modalities and opportunity to reach a large, needed audience. Efforts to develop educational programs for individuals in need of psychological assessment and treatment are seen at the cutting edge of health care delivery.

2) Legal issues related to licensure state by state and the fact that satellite telemetry would raise issues related to health care provision outside an individual domain is another important concern. Legislative issues related to emergency interventions will have to be addressed with respect to the licensure of individuals in providing crisis intervention services in domains outside the range of licensed professionals.

3) The impact of cost on the provision of service must be evaluated through clinical research and outcome studies to assess the effectiveness of the use of telecommunications in the provision of psychological services.

Researchers (Mahev, 1997) should try not only to determine the effectiveness of clinical care delivered through telehealth, but should specifically try to identify:

- Diagnostic and treatment modalities that are best suited to electronic delivery systems
- Child, adolescent and adult populations that will be best served by telehealth
- Methods of keeping video-taped sessions and other electronic medical records

secure and confidential.

- Suitable means of providing standardized health care services to children and families in under served rural settings.

Telehealth approaches to diagnosis consultation and treatment intervention should maximize the use of direct clinician to clinician consultation, assuring of proper credentialling and professional education and training in these specific areas of consultation. Telehealth and its adaptability to psychological services offer new avenues for provision of clinical care in the areas of education, consultation, administration, research, and treatment services. Historically, educational programs including continuing education programs have provided access to health care providers for important areas of diagnostics and treatment. New avenues of health care provision, consultation and diagnosis and therapeutic management of children in the schools through supervised experiences offer us a glimpse of the cutting edge of health care delivery through telehealth for those needed services in rural Kentucky.

FIGURE 1: EMERGING PATTERNS IN TELE-EDUCATION AND TELE-HEALTH

	PAST TRENDS	CONTEMPORARY PATTERNS
Administrative Paradigms	Hospitals and medical centers, independent physician practices and independent provider services with schools not in partnership	School and healthcare partnerships, networks and alliances; physician contracting integrated delivery systems of care with teams of providers through the schools
Management Models	Provider-focused teachers and specialists physicians, individual providers/specialists providing services on an independent basis	Student-focused, teachers and school administration, primary care providers, team of providers and specialists provide services through school systems
Information Systems	Paper school and medical record, provider developed record systems, local network accessibility	Electronic school and medical record, on-line support systems, E-mail, electronic file and exchange for comprehensive and integrated information on a child
Prevention-Intervention	Minimal incentives for prevention based initiatives in the schools relating to health promotion and prevention	Healthy lifestyles/wellness and health care promotion, students receive accurate information based on clinical research through Interactive Video Systems

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